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ABSTRACT

The workshop described in this report focused on uses of educational technology in the training and upgrading of teachers and on promoting the use of appropriate educational technology techniques by teachers. Experiences in the use of educational technology are described for each of the participating nations, i.e., Bangladesh, India, Indonesia, Japan, Malaysia, New Zealand, the Philippines, Republic of Korea, Sri Lanka, and Thailand. Methods of preparing teachers and teacher educators to use educational technology are then discussed, both in general and in reference to specific widely-used programs: (1) the Personalized System of Instruction (PSI); (2) the Later Reading In-Service Course (LARIC) used in New Zealand; (3) the Education Resource Centres used in Malaysia; (4) the distance education program, Advanced Studies Unit, used in New Zealand; and (5) both internal and external networking systems used in teacher training in Thailand. Participants also visited the Han Nam Elementary School, an experimental school in Korea which promotes the use of educational technology in the classroom, and the Samsung Electronics Co. Ltd., which produces computer hardware and other electronics products. Finally, the participants developed a series of recommendations designed to improve teacher training in the use of educational technology. Two appendices contain the agenda for the workshop and a list of participants. (EW)

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TEACHERS AND THEIR USE OF EDUCATIONAL TECHNOLOGY

Report of a Regional Training Workshop

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Report of a Regional Training Workshop
Seoul, 16-27 September 1985

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PREFACE

The APEID Regional Training Workshop on the Use of Educational Technology by Teachers was jointly organized by APEID, UNESCO Regional Office for Education in Asia and the Pacific and the Korean Educational Development Institute (KEDI), with the co-operation of the Korean National Commission for UNESCO in Seoul from 16-27 September, 1985.

The Workshop was attended by one participant each from Bangladesh, India, Indonesia, Japan, Malaysia, New Zealand, Philippines and Sri Lanka, three participants each from Thailand and the host country the Republic of Korea, as well as two observers each from the Republic of Korea and Thailand. The list of participants and observers is provided in Annex 2.

The Regional Workshop addressed itself to the following purpose : to contribute through exchange of experience among the participants to the development of national capacities for the planning, production, utilization and evaluation of effectiveness of innovative educational technology methods used in the initial training and further upgrading of teachers, designed to promote the use of educational technology, and to develop in pupils qualities such as creativity, initiative and the critical faculty, a sense of responsibility, understanding and respect for others.

The Regional Workshop was focused specifically on the use of educational technology in the training and upgrading of teachers, aiming to promote their use of appropriate educational technology techniques.

The major objective of the Regional Training Workshop was to enable teacher educators and educational establishments to promote the use of educational technologies by teachers.

The workshop considered various issues affecting the use of educational technologies, such as:

i) the knowledge, attitude and teaching skills required by teachers in order to use educational technology successfully in school education;

ii) the kinds of preparation which should be given to trainees and experienced teachers in order to use and appreciate, the role of educational technology in school education;

iii) the knowledge and skills about the role of educational technology in education that are required by teacher educators and how their knowledge and skills may be upgraded; and

iv) the change or innovations which should be introduced into pre-service and in-service education to ensure that new, and experienced teachers, gain the required knowledge, attitudes and skills associated with the use of educational technology in various schools.

Prior to the Workshop, Institutions in three of the participating countries, namely India, New Zealand and the Republic of Korea prepared multi-media kits, specially designed to solve specific problems in teaching in one-teacher schools, in minority and multi-cultural classes and in large classes. The kits were presented during the workshop and evaluated by the participants with a view to their usefulness and applicability in their own countries.

The description of these multi-media kits is provided in a separe publication, entitled Preparing Multi-Media Teaching Materials – A source book.

In addition, the participants from all countries, demonstrated during the workshop, selected exemplar educational technology materials like teaching/learning aids used in classroom teaching, which were also evaluated by the participants of the Workshop.

Some of the participants illustrated the presentations of their countries experiences with projection of overhead projector transparencies, slides and videotapes prepared especially for the Workshop.

Procedures of the Workshop. The Workshop was inaugurated by Dr. Sohn Jae-suk, Minister of education of Rep. of Korea, represented by Dr. Sun Jae Cho, from the Ministry of Education.

Dr. Cho Sung-ok, Secretary general of the Korean National Commission for UNESCO and Dr. Kim Young-shik, President of KEDI also addressed the participants.

The participants unanimously elected Dr. S. I. Park as Chairman, Mr. Md. Rezaul Karim as Vice-Chairman, Dr. B. R. Goyal as rapporteur and Dr. Jovito Castillo was elected associate rapporteur.

The various topics discussed during the Workshop, listed in the Agenda, which is presented in Annex 1 of the report, were discussed in plenary sessions, followed by working group sessions.

The participants of the Workshop visited selected educational institutions with innovative experiences of utilization of education technology in the Republic of Korea and their impressions of the visits are reflected in Chapter Three of the report.

Based on the analysis of the participating countries experiences and observations during the visits the participants prepared a set of suggestions for improvement of the training of educational personnel at various levels so as to promote the effective use of educational technology. These suggestions are presented in Chapter Four of the report.

The organization, the procedures and the outcomes of the workshop were evaluated by the participants at the end of the workshop.

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Chapter One

USING EDUCATIONAL TECHNOLOGY BY TEACHERS TO PROMOTE EFFECTIVE LEARNING.

The Regional Workshop focused on the use of educational technology in the training and upgrading of teachers, aiming to promote their use of modern educational technology techniques. It was attended by teacher educators, educational researchers, administrators, educational technology specialists and teacher training curriculum developers, who are presently involved in teacher education through the use of educational technology, or in the development of educational technology materials.

This chapter gives a summary of the participating countries experiences in the use of educational technology through promoting teachers' awareness and competencies, and through development, distribution and utilization of various media. The following pages describe briefly the educational systems, major goals, some important current issues, growth points and future plans of the participating countries, as well as some problems and constraints, and innovative practices and policies developed for overcoming them.

BANGLADESH

The education system in Bangladesh today is facing a great challenge. Under the present educational reconstruction plan, certain measures have already been initiated while more changes are envisaged. The present system of education comprises five years primary, five years secondary, two year higher secondary and three to five years of higher education. Teacher education and training are a part of the education system. The pre-service and in-service teacher education programmes comprise two streams – one for primary school teachers and the other for secondary school teachers. While primary Teacher Training Institutes (PTI's), Teacher Training Colleges and the Institute of Education and Research (IER) of Dhaka University offer the pre-service training; the National Academy for Primary Education (NAPE), National Institute of Educational Administration, Extension and Research (NIEAER), Bangladesh Institute of Distance Education (BIDE) and Bangladesh Education Equipment Board (BEEB) are responsible for the in-service training of teachers.

To improve the teaching/learning process, the teacher educators are fully aware of the advantages of using educational technology. But the effective use of modern educational technology has been limited due to teacher apathy, lack of resources and lack of adequate training facilities.

Educational technology in Bangladesh implies the utilization of different types of low-cost audio-visual teaching aids and instructional materials, besides the limited use of mass media such as radio and television. Keeping in view the

dearth of science equipment and teaching aids, the government has set up organizations to solve the problems associated with the increasing demand for teaching aids and materials by the schools. Two of these organizations are BIDE and the Bangladesh Educational Equipment Board, (BEEB) which are under the direct control of the Ministry of Education. Bangladesh Radio is now broadcasting educational programmes regularly every day and the feedback received from the students indicates that the broadcasts contain elements of considerable educational interest. At the beginning of the academic session, Radio Bangladesh in collaboration with BIDE outlines and prepares the programme. The schools are then informed about the broadcasts through a booklet containing dates, time and titles of the programmes. Bangladesh TV has been telecasting educational programmes which are popular among the students.

BEEB is producing and supplying charts and other low-cost equipment to the primary and secondary schools. The teachers are being trained in their use by institutions like NAPE, NIEAER, BEEB and BIDE.*

Though no systematic evaluation on the use of educational technology by the teachers has been made so far, the general opinion is that the teachers seldom use these materials.

All Teacher Training Colleges offer audio-visual education as a unit of a course called 'Principles of Education', while IER of Dhaka University offers Education Technology as an optional paper. The training courses at the PTI's have also improved the competencies of the trainees in the preparation and use of instructional materials. Various types of in-service training are conducted by NAPE and NIEAER for primary and secondary school teachers respectively to familiarize, reinforce and update the knowledge of teachers in the field of educational technology.

There is an increasing awareness among teachers and educators of the need to use educational technology to improve the quality and effectiveness of teaching in the classrooms. The Ministry of Education feels that the use of educational technology can make the subject matter more comprehensive as well as arouse the pupils' interest and attention. To achieve this, the government has been laying special emphasis on education during the Third Five Year Plan (1985-1990). The Education sector as a whole has received top priority and in the budget for the 1985 fiscal year the allocation for education is the second highest, after defence. One of the basic objectives in the education sector of the TFYP is "to improve the training and qualification structures of the teaching force at all levels." The plan envisages that special emphasis be given on the training of teachers for knowledge, skill and attitude to use educational technology. During the plan period BIDE will be responsible for producing software such as audio and video cassettes, radio programmes, printed course materials and video programmes. BEEB will be strengthened further to mass produce overhead projectors and low-cost equipment required in the schools. A science museum has been established and both teachers and students are encouraged to develop new science equipment based on locally

* NAPE – National Academy for Primary Education.

available materials. Annual science exhibitions will be organized and prizes will be awarded to the best designer for encouraging innovative ideas.

The Government is very keen to develop educational technology in the Teachers' Training Institutions. However, there are resource constraints besides the shortage of relevant literature and necessary expertise. One of the important problems relating to educational technology is the problem of utilization. It has been observed in many instances that the materials that have been developed and distributed to schools have not been fully utilized. Either the teachers do not know how to use them, or they are not sufficiently motivated to use them, or sometimes these materials are not relevant to the specific teaching/learning situations. It is therefore necessary that the problems encountered be identified and possible ways and means for solving them established.

INDIA

The structure of the educational system is ten years of general schooling with two years senior secondary (vocational) education.

At the elementary level (grades I-VII/VIII), the rate of educational drop-out and repetition is quite high. The major constraints are that in many rural areas children are first generation learners; schools are poorly equipped; teachers are not up-to-date in their knowledge of content and pedagogy; and parents are generally too poor to afford education. Multilingualism makes it difficult to process information and affects educational reforms. The Nation's resolve is to universalize elementary education through the adoption of full time, part time, own time educational approaches by 1990. The use of educational technology is being considered as a useful strategy to achieve those targets.

The application of media to enrich the quality of teaching has been advocated for a long time. To provide educational personnel with the insights, skills and knowledge in the development and use of media, a number of national, regional and state level institutions have been established. The National Institute of Audio-visual Education was established in 1948. It was merged into the National Council of Educational Research and Training in 1961. The Centre of Educational Technology was created in 1974. It was converted into the Central Institute of Educational Technology (CIET) in 1984 with a widened scope for use of educational technology. It has a big film library, television and radio studios, mobile television van, and departments for developing the non-projected and projected media materials. A large number of video and audio-tapes have been developed as curriculum support materials.

In addition, educational programmes are also telecast by satellite to selected rural schools in six states. The satellite coverage is being expanded. The central organization i.e. the CIET has its counterparts in the states which promote educational technology activities in their respective regional languages.

Presently 68 radio broadcasting stations are providing educational broadcasts. The television network is also used for instructional television programmes.

Teachers and their use of educational technology

A multi-media package programme for training primary teachers to teach science and a radio series for teaching language to children have been produced and successfully used. A series of educational broadcasting titles for the in-service training of primary school teachers has been identified. Computers have recently been introduced in selected schools.

In spite of the efforts, the needs have still not been met. Production is short of expectations; distribution gets weakened due to language differences and geographical reasons; and utilization is not assured due to poor facilities, lack of teacher training and inadequate educational supervision. Whenever concerted efforts in the use of educational technology have been made, evaluation studies have reflected positive results.

One of the weak points in the integration of educational technology into the educational system has been the lack of teacher training programmes in educational technology. Short term in-service education programmes to selected teachers have not generated an appropriate climate for the use of educational technology. There is a need for incorporating theory and practice of educational technology into the pre-service teacher training programmes for both secondary and elementary teachers.

Massive crash programmes of in-service teacher education are needed to generate awareness, to develop commitment and competencies in the teachers for optimal use of educational technology. In-service training programmes for teacher educators and educational administrators are also necessary.

Research, particularly developmental research and innovations in educational technology are encouraged and recognized. 'Innovations in Education' and 'Seminar Readings' are the national level programmes where innovations and new methodologies of teaching are identified, scrutinized, selected and publicized. Inventivess and innovation are encouraged through awards and merit certificates.

The policy is to accord educational technology a significant place in the educational sector. To restore its proper concept, educational technology is visualized as a total system to tackle educational problems rather than mere application of new technology. For its expansion and utilization, it is contemplated to create a network of hardware and infrastructure for producing appropriate quality software both for teachers and students.

The future plans are to popularize the use of educational technology by developing commitment and competencies in the teachers and also by providing a strong support base to the area. Intensive work on the development of materials for the following clientele is envisaged:

i) children of age group 6-14 years : both in the formal school system and out-of school children;

ii) Parents and public at large;

iii) Teachers at all levels; and

iv) Educational planners and administrators.

To meet the growing needs of this vital field, the following types of activities are being undertaken.

i) Training through short term courses, fellowships and intensive training courses for the production personnel and for teachers;

ii) Documentation and information services;

iii) Production of materials; and

iv) Research and development activities.

Pre-service and in-service training programmes for teachers and teacher educators are also planned.

INDONESIA

The government of Indonesia promotes the use of educational technology to improve the general quality of education and to expand educational opportunities from kindergarten to tertiary level. At present about 98 per cent of the children aged from 7-12 attend one of the various types of a primary school within the education system. Every effort is being made to provide more students with access to secondary and tertiary education.

In 1979 the government established the Centre for Educational and Communication Technology, which is responsible for promoting educational technology concepts and principles, carrying out and co-ordinating activities based on those principles for improving the learning process both in school and out of school.

Educational technology is being used to assist in the improvement of the quality of education by encouraging teachers to use the Procedures for Developing Instructional System (PPSI) approach.

There are five steps involved are the:

1. formulation of specific instructional objectives;
2. development and construction of evaluation test items;
3. analysis of learning tasks and materials;
4. development of learning materials, methods and strategies for classroom use; and
5. implementation of the instructional design schedule.

In Indonesia there are major transportation and communication problems in 14 of the country's 27 provinces. The government provides in-service training for primary school teachers in these remote provinces through the use of radio broadcasting. Some of the curriculum areas which have been covered by the medium of radio include mathematics, natural science, civics, Indonesian language,

state ideology, social sciences and religion. These radio programmes are broadcast for 17 minutes daily and then repeated in the evening by local radio stations.

In some universities, including IKIP*, (the Institute of Teachers' Education and Training), the government has established Learning Resource Centres, and the Inter-University Centres which help lecturers to develop instructional materials, and provide lecturers and students with instructional materials such as slides, tapes, films and video cassettes. The Directorate of Non-formal Education has established six learning resource centres for the out-of-school education activities where tutors can produce slide-tape programmes, audio programmes, leaflets and booklets. The establishment of these centres has been done with the assistance of the World Bank. Ten additional centres will be established in 1985.

Slide-tape programmes from the Centre for Educational Communication Technology are distributed to the 27 representatives of the Ministry of Education for use by teachers in the provincial districts.

The implementation of open junior high schools was begun in 1979. This innovative system is aimed at expanding the opportunities for junior secondary education for those students who are economically unable to attend the regular schools, or who live a long distance away. In the open junior high schools the students are required to learn mostly by themselves through the use of media (mainly modules).

The Open University which started in 1984, is aimed at expanding the opportunities for higher education for the graduates of senior high schools. In this open university, the students interact with printed modules, supplemented by audio and television programmes.

The government provides radio programmes for out-of-school educational activities in 13 provinces. These programmes are also available on audio cassettes.

Provincial representatives of the Ministry of Education in co-operation with the Directorate of Primary Education, Directorate of General Secondary Education and the Centre for Educational Communication Technology have been conducting a wide range of in-service training programmes involving educational technology which is aimed at assisting teachers in developing knowledge and skills in:

a) design instruction;

b) instructional development;

c) types and characteristics of educational media;

d) producing teacher made/low cost media;

e) utilizing media in the teaching-learning process;

f) formulating specific objectives based on identified problems or needs; and

g) developing materials, strategies, methods and evaluation test items.

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* IKIP = Institute Keguruan dan Ilmu Pendikan.

One of the important changes is that the curriculum for teacher education is based on the teaching competencies needed by classroom teachers, thus the curriculum of teacher education at the IKIP (Institute for Teachers Training and Education) consists of four components:

1. General foundation courses which aim at developing good citizenship with personal, social and cultural competencies;
2. Inquiry into education courses which aim at providing the students with the concept of the nature of education in general and how this relates to individual and social contexts;
3. Subject area content for teaching specialization courses which aim at defining the content to be taught; and
4. Learning-teaching process courses which aim at developing competencies needed for general methods of teaching and the mastery of specific techniques and procedures related to the specific subject area. Educational Technology is one of the courses in this category which aim at developing competency in general methods of teaching, which need to be addressed to ensure the achievement of specific instructional objectives.

Some of the problems related to the effective and extensive use of educational technology include the following:

1. The need for more equipment and personnel, to reproduce software, which at present, cannot be done in large numbers due to the scarcity of financial resources;
2. There are too few educational media specialists; and
3. The awareness of the value of educational technology of school administrators and principals and teachers needs to be increased.

To successfully adopt and implement educational technology two things in addition to financial resources are essential:

1. Increased awareness by all people concerned with education. These include educational policy makers, educational administrators, supervisors, school principals, classroom teachers, and teacher trainers.
2. The employment of graduates of the educational technology department from IKIP at places where educational technology activities are being implemented, such as, Learning Resource Centres, Media Centres, Curriculum Centre, Centre for Educational Communication Technology. These requirements are now being gradually accepted in Indonesia. This will ensure the successful implementation of educational technology in the future.

Teachers and their use of educational technology

In the fourth five-year-development plan, which covers the period 1984/1985-1988/1989, the adoption and implementation of educational technology in the educational system includes:

1. Continuation of the production, reproduction, distribution, utilization of slide-tapes and audio cassette programmes for secondary school teachers in natural sciences (biology, physics), social sciences (history, civics), and mathematics;
2. Extension of open junior high school;
3. Extension of the open university;
4. Extension of Learning Resource Centres and inter-university centres at the universities/IKIP;
5. Extension of the Educational Technology Department at IKIP;
6. Continuation and extension of in-service training for elementary school teachers through the use of radio; and
7. Use of video or television for primary school teachers in-service training.

JAPAN

The education system in Japan consists of six years primary, three years junior high, three years senior high, and four years university. Compulsory education was extended from six years to nine years. However, with the high economic growth in Japan the number of students who wish to enter senior high schools and universities has dramatically increased. Over 95 per cent of junior high school graduates enter senior high schools. The social demands for education have also changed. Therefore, the Extraordinary Education Council (a government advisory body) has been reviewing the educational system with a view to implementing future reforms.

Use of educational technology. During 1983, the Bureau of Social Education, at the Ministry of Education, Science and Culture, conducted a survey on the availability of audio-visual equipment and microcomputers in schools and social education facilities in Japan. According to this survey, the percentages of schools equipped with audio-visual equipment are as follows:

1)	16mm film projectors	60.2 per cent
2)	8mm film projectors	68.6 per cent
3)	slide projectors	97.0 per cent
4)	cameras	78.5 per cent
5)	overhead projectors	95.0 per cent
6)	in-school broadcasting systems	96.6 per cent

7)	TV sets	98.9 per cent
8)	VTRs	78.5 per cent
9)	tape recorders	98.4 per cent
10)	record players	94.8 per cent
11)	radios	98.5 per cent

The percentages of schools equipped with microcomputers was 0.3 per cent of kindergartens, 0.6 per cent of elementary schools, 3.1 per cent of junior high schools. However, the percentage of senior high schools was 56.4 per cent; much higher than that of the other types of schools.

As shown above, except for film projectors, cameras, and VTRs, the diffusion rates of various types of equipment throughout schools in Japan are close to 100 per cent. According to the report, the highest level of utilization was of TVs followed by overhead projectors, and tape recorders. The most commonly used media in kindergartens were record players, TV sets in elementary schools, overhead projectors in junior high schools, and VTRs in senior high schools. It should be noted, however, that record players, which were rated highest at kindergarten level, show the average rate of utilization of only about once a week! Another finding of this survey is that the more the teachers participated in audio-visual media training programmes, the higher their utilization rate of the media. This may show that in-service training of teachers in the use of those media nourishes the knowledge, positive attitudes, and skills which will contribute to promoting their use.

Some recent developments in pre-service and in-service teacher training. Kunihiro Kojima et al. have been developing video tape programmes to be used exclusively for improving the pre-service training of student teachers. Based on a pre-production survey, they decided the most desired contents for such materials.

They are on instructional process, significance of pre-service training, and instruction planning. To meet this purpose, they have videotaped both intra and extra-curricular activities of student teachers. These materials have been experimentally used by 55 teacher educators in pre-service training of student teachers, and received a fairly high evaluation. Thirty more such teaching materials were developed during 1985.

The Ministry of Education, Science and Culture, the prefectural boards of education, and the prefectural educational centres provide opportunities for systematic in-service training for public school teachers. Various kinds of workshops and seminars on school education are held throughout the year.

Universities also conduct workshops, seminars, and classes for in-service teachers and/or public civil Servants. The system is called "open-class lectures", financed by the Ministry of Education. In 1983, for example, 291 national, public, and private universities and colleges conducted a total of 1,895 of these lectures including workshops and seminars. A total of more than 215,000 teachers and citizens participated in the lectures.

Teachers and their use of educational technology

The University of the Air, which exclusively uses TV and radio broadcasting, has been opened since April 1985. More than 18,000 citizens are enrolled in this University. Presently the area of its educational services is still limited to Tokyo and its vicinity. With a rapid development of information technologies, the learning institutions of this kind would become one of the prospective approaches to life-long education for all citizens including teachers. However, the effect of this new education system on the improvement of teaching quality is not known yet, because it is still in its infancy.

Problems and needs in the effective and extensive use of educational technology – research and innovations. It is said that university courses in educational technology in Japan have not been well balanced between theory and practice. In other words, laboratory work, drill, and clinical work have been relatively poorer than theories in the courses. It is necessary, therefore, to have the courses with consolidated theory and practice to meet the current diffusion of new information technologies into the classroom.

Kuniharu Imae et al. conducted research on the "Competency Levels Required of Specialists in Educational Technology" *(Japan Journal of Educational Technology,* Vol. 8, No. 3, 1984). The questionnare they mailed had 90 items. Through the analysis of 563 responses, they found that the required competency of specialists in educational technology was categorized into five types, which could be summarized as follows:

1. Instruction planning, ability to conduct instructional research;
2. Production of teaching media, ability to operate equipment;
3. Ability as a researcher;
4. Ability to develop and manage educational systems; and
5. Basic knowledge in education.

Further, they found that the competencies required by the specialists were different in educational institutions at which they worked. Elementary or secondary school teachers were required to have competency in curriculum planning, ability to conduct instructional research, production of teaching media, and equipment operation. On the other hand, university teachers were required to have the competency to conduct research and manage the development of educational systems. The results of this research may show a possible guideline in organizing a curriculum for educational technology.

Inoue et al. reviewed the literature on research findings and surveys, and tentatively divided the field of educational technology into three areas:

1. Instruction analysis, design and evaluation;
2. Development and use of instructional media, educational aids and media; and
3. Educational data processing.

Based on these areas, they proposed an innovative curriculum for educational technology. Further they made a classified table of the topics in the curriculum indicating the teaching content for undergraduate and graduate levels.

Organization and administration for the adoption and implementation of educational technology. There are now centres for educational technology or centres for educational research and training in 34 national universities. These centres constitute the Council of National University Centres for Educational Technology. Every year, the Council holds two study meetings to share research experiences with each of the centres. Through these activities, the centres have been playing vital roles in promoting research and development of educational technologies. Other professional societies are the Japan Society of Educational Technology, Japan Society for Science Education, Japan Society of Audiovisual Education, Japan Society of Computer Assisted Instruction, Japan Society of Electronics and Communications, and Japan Council of Educational Technology Centres. Research conducted by the members of these organizations are published yearly in two kinds of journals; four issues in Japanese, and one in English.

Future plans for computer education. As for the utilization of microcomputers in education, a Report on the Present State of Availability of Audiovisual Education Equipment in Schools and Social Facilities (The Ministry of Education, Science and Culture, March, 1984, Tokyo), shows the teachers' opinions collected by requesting them to respond to the following statements:

1. Computers are worth utilizing actively as a media for teaching and learning: affirmative 64.5 per cent, negative 30.4 per cent, neutral 5.1 per cent;

2. Active utilization of computers for processing educational information is worthwhile: affirmative 79.3 per cent, negative 15.7 per cent, neutral 5.0 per cent;

3. Computer education is necessary to the utilization of computers: affirmative 71.3 per cent, negative 23.8 per cent, neutral 4.9 per cent;

4. Development of software is important for the utilization of computers in education: affirmative 78.1 per cent, negative 16.7 per cent, neutral 5 per cent; and

5. Computers are useless in education: affirmative 11.8 per cent, negative 82.6 per cent, neutral 5.5 per cent.

As for the utilization of microcomputers in senior high schools, only 27.5 per cent of industrial high schools, and 18.6 per cent of commercial high schools use microcomputers twice or more a week. The rest of the schools remain very low in the percentage of microcomputer utilization.

As we have seen above, the teachers' awareness of computer utilization in education is very high. But the actual utilization of it in education is rather low. This shows the need for in-service training of teachers.

Teachers and their use of educational technology

Although microcomputer use is gradually spreading in schools, evaluative research has not been abundant. Therefore, a report of the Consulting Committee of the Division of Learning Information, at the Bureau of Social Education, Ministry of Education, Science and Culture, shows teachers and educators the result of the study on the relationship between microcomputers and school or social education. In the report, the types of educational use of microcomputers, some points on their utilization, and how to perform computer education are stated. The report is the first of this kind, and will be a useful guide for teachers.

Prof. Kijun Oda conducted an interesting research project on the preparation needed for computer education for teachers' college students. ("Students' Attitude for Computer in Education", Research Report, The Centre for Educational Technology, Mie University, Vol. 5, 1985). He found that, in computer education for teachers' college students, philosophical viewpoints were very important in the curriculum content in supporting the introduction of computer into school education. The "Why's" of introduction of computers into school education should be taught first, rather than "how" to use them.

Research of this kind for the development of people's computer literacy is needed to meet the coming information-oriented societies.

MALAYSIA

The Education policy of Malaysia envisages to provide equal opportunities for the various races, to achieve the objectives of national integration and to fulfill the needs of skilled manpower for the rapid progress of the nation.

The implementation of the 1961 Education Act improved the quality of education in Malaysia by the establishment of institutions, such as the Educational Planning and Research Division, Educational Media Service Division and Curriculum Development Centre.

More than three quarters of the schools are situated in rural areas, with comparatively low standards of education, due to the lack of sufficient educational facilities. Following the findlings of a Dropout Study Report in 1972 the standard of primary education in rural areas has been improved by providing better physical facilities, suitably trained teachers, and various educational technology programmes such as educational radio, educational television and audio-visual aids to help teachers in their classroom teaching.

The teacher training programme has also been modified from a two year course to a three year course. Besides this, the in-service teacher training in curriculum and methodology placed emphasis on educational technology. The Ministry of Education has enhanced the role of school libraries which are lately known as School Resource Centres.

The Educational Media Services Division (EMSD) was established in 1972. It has three main sections: Educational Radio, Educational TV and Audio-Visual

Aids Section. The main role of this division is to provide supporting services aiming to improve the standards of school education.

The EMSD is situated in Kuala Lumpur and has representatives in all State Educational Offices to extend its functions to the schools within each state. EMSD is aiming to improve the quality of education by providing training to teachers on use of educational technology and to produce the development of media materials.

The Educational Media Services Division has supplied each State Education office with equipment to copy and is tapes. In addition, a pioneer project supplied 96 schools with video recorders between 1979 and 1984. The EMSD supplies all secondary schools with video recorders and certain primary schools that have difficulties in receiving clear TV transmission.

The EMSD has also established District Education Resource Centres (DERC) in all states. Hardware materials such as reprograph, audio-visual and photographic equipment are presently supplied to the DERC. Under the 5th Malaysian Plan (1986-1990) an additional grant totalling M$ 16.6 Million will be allocated for purchasing media materials.

EMSD will gradually replace the present television sets in schools with new solar powered TV sets. Since 1984 more than 100 schools were selected for this pioneer project. Starting from early 1986 all schools will be provided with TV sets.

The EMSD also provides media resources on loan such as 16mm films, 35mm films, film-slides and other audio-visual software materials.

The teachers in the training colleges and universities in Malaysia are exposed to Education Methodology and basic Educational Technology included in their courses of studies. However, the courses offered are only elementary, as the time alloted is very limited, due to the variety of many other subjects. Thus, when the teachers graduate from the college or universities, they have to undergo a more intensive in-service, practically-oriented course to enable them to improve the quality of their teaching.

At the Teacher Training College in Kuala Lumpur, a one-year special course has been in operation since the 1960s. This course is offered to train teachers, with at least five years teaching experience and who have an interest in the use of audio-visual aids. In 1981 the syllabus was revised and the respective subjects modified from the old Audio-Visual Course to the new Educational Technology Course.

The 3rd Malaysian Plan (1976-1980) envisaged setting up State Education Resource Centres in four states, viz. Pahang, Terengganu, Kelantan and Kedah as a pioneer project. The aim of the project was to overcome the problem of poor educational performance in these states by providing proper educational technology facilities to the centres. The implementation of this project was delayed and was completed in the 1983/1984 school year.

Teachers and their use of educational technology

Malaysia has started using computers in education and some schools already have ten or more computers.

Teacher Training Institutions have not yet introduced Computer Literacy Courses. However, degree courses on computers are offered at some of the local universities. The Curriculum Development Centre together with the Schools Division of the Ministry of Education are initiating a pioneer project on Computer Education, starting with twenty selected Secondary Schools throughout the country. The schools identified for this programme already possess their own computers and the training of teachers to run this programme was conducted in 1985.

Some State Education Departments have organized Computer Exposure Courses for headmasters and teachers with the co-operation of local computer companies which supplied the necessary software and hardware. In December 1983, the Schools Divisions also ran a short course for teachers in Penang.

NEW ZEALAND

The New Zealand education system is free, secular and compulsory. Compulsory education begins at the age of six and continues to age fifteen. Most children, however, start school at five years of age and leave at sixteen or seventeen after taking the national School Certificate Examination.

Use of educational technology. Extensive use is made of educational technology in schools. All primary and secondary schools are provided with overhead projectors, radios, cassette recorders, slide projectors, and reprographic equipment. In addition, more than 90 per cent of schools have purchased movie projectors and borrow films from the National Film library. The use of video tape equipment is rapidly increasing as all secondary, and approximately one third of primary schools have purchased video playing machines from community raised funds. These schools are able to obtain video tapes, on loan, from the video section of the National Film Library.

Recent surveys of computer equipment in schools show that 98 per cent of secondary schools and approximately 15 per cent of primary schools have now puchased microcomputers.

Computers present the same problem for teachers as other technological break-throughs, but the advocacy for computers is on a scale and of an intensity that has not been experienced previously. This has led to pressures from the community for schools to obtain microcomputers, and to pressures from hardware suppliers for consideration of their machines for Government supply to schools.

The Department of Education is aware that the focus in education should be on the use to which microcomputers are put, in learning and teaching. The essential element, therefore, is quality courseware/software. As well, provision needs to be made for pre-service and in-service training of teachers; teaching space, security and building adaptations; and servicing the machines.

Because the quality use of computers depends more upon the quality of the courseware/software than upon that of the hardware, the Department's Computer Courseware Development Unit is attending, amongst other tasks, to:

the establishment of standards for courseware/software;

the examination of the possibilities of standardising on a suitable language; and

ensuring that schools have available to them courseware/software which is compatible with the New Zealand curriculum, intrinsically interesting and educationally worthwhile.

Pre-service teacher training. The pre-service training of primary teachers is conducted in six teachers' colleges located in urban centres throughout the country. Secondary teachers are trained at the two major secondary teachers' colleges and there are several small secondary training units at the primary teachers' colleges.

The basic course for primary teachers extends over three years. Secondary teachers may undertake a four year concurrent university degree and teacher training course or a one year course after completing a university degree. Primary and secondary teachers' college courses are followed by two years of probationary teaching in a school. Successful completion of both the teachers' college course and the probationary years leads to certification as a teacher.

Primary teachers are trained to teach all subjects in the primary school curriculum while secondary teachers specialize in two or more of the subjects taught in secondary schools.

In 1982 as part of a general review of teachers' colleges, it was agreed that a 50 hour course in audio-visual education would become part of a minimum basic core of essential courses for teachers in training. As an adjunct to these basic courses more specialized options were made available in audio, visual and other aspects of educational technology.

In recent years information technology has had a significant impact on teacher training. While the Government has yet to announce a policy for computers in education, teachers' colleges have been encouraged to explore the use of computers in education by using their existing resources. All colleges offer basic courses in computers and some offer more advanced options.

In-service teacher training. Several provisions are made for the in-service training of teachers in educational technology. National courses, where members are selected from throughout New Zealand are held at the Department's full-time national residential centre in Auckland. This facility is used as a national conference and working party centre for the development of those issues and policies to which high priority has been given.

Another national in-service provision of considerable importance is the Advanced Studies for Teachers Unit of the Department of Education. The unit offers a wide range of substantial distance education courses, to people who are

involved in some teaching function. The two courses offered in educational technology are approximately at the first level of a paper for a bachelor's degree. They are "Educational Technology" and "Media Studies". Teachers within reasonable distance of the six teachers' colleges may enrol for courses which are similar in content to those offered by the Advanced Studies for Teachers Unit. The teachers' colleges also offer advanced courses in computer technology. These courses involve attendance at lectures, seminars and workshops held outside school hours, usually in the evening.

A key structure in the organization of in-service training in educational technology at the local level is the District Senior Inspector's In-service Training Committee; there is one of these committees in each of the ten education board districts. Approximately 60 per cent of the sum approved annually by the Government for in-service training purposes is allocated to districts, with each district senior inspector being responsible for the expenditure of his or her district's portion of the allocation. The major portion of each district allocation is spent on employing relief teachers. This provision enables regular teachers to be released from their classrooms to attend courses for which they have been selected, or for which they have applied to attend and been accepted. Some money is also set aside to meet the necessary travelling expenses of teachers attending courses and for equipment used.

Training of teacher educators. The appointment of professional staff in audio-visual education was followed by the development, within each teachers' college, of courses related to educational technology and learning and teaching media. Alongside the improvement in the quality of courses, each college established audio-visual learning resource centres to provide a focus for learning and teaching support services. By 1980, teachers' colleges provided the staff and students with an extensive range of audio-visual equment and materials. Teachers' college lectures are encouraged to develop expertise in the use and application of educational technology as it relates to their specialist teaching subjects.

Problems and needs. To ensure that effective use is made of educational technology in schools it is considered essential that teachers have ready access to well maintained hardware and a wide range of high quality software programmes. Teacher competence in educational technology needs to be developed through effective pre-service and regular in-service training programmes. Access and competence together will help in providing teachers with the confidence to use educational technology in developing more meaningful learning experiences for the children in schools.

Organization and administration for educational technology. Within the Department of Education, the Resources Development Division has a particular responsibility for resources for learning. The Division comprises the Audio Production Unit, the National Film Library, the School Publications Branch and the Visual Production Unit as well as officers responsible for libraries and information systems and for equipment. The Resources Development Division provides print, visual and audio-visual resources for teaching and learning. These resources include

publications for children and teachers, filmstrips and slide sets, slide-tape sets, overhead transparencies, films, video cassettes, charts, posters, audio cassettes, picture packs and kitsets composed of various combinations of these resources.

The Computer Courseware Development Unit (CCDU) is a recently established section of the Curriculum Division of the Department of Education.

Future plans. In 1975 the Government approved the establishment of three teacher resource centres to provide local teachers with access to a range of teaching resources not readily available to individual schools, the opportunity to engage in in-service training activities, and to meet with teaching colleagues and evaluate new educational aids, equipment, technology, methods and materials.

Approval has been given for the establishment of six new centres, in different localities, in 1986. Together with the three existing centres they will provide the basis for a national network of teacher resource centres throughout New Zealand.

In setting priorities for the work of the Computer Courseware Development Division the recommendations of a Consultative Committee on Computers in Schools, which met in 1981-1982, are being followed. Priority will be given to supporting computer awareness and computer studies courses initially, and then to servicing the courseware needs of other school curriculum subjects.

The Department of Education is to sponsor a number of exploratory studies in the applications of computers in education during the period February 1986 to July 1987. The purpose of these studies is to explore the most effective uses for microcomputers in New Zealand schools and they will involve development projects aimed at gaining experience of computer applications to New Zealand syllabuses and methods of teaching. They will each be linked with a teachers' centre or a resource centre and, although not large-scale, they may link groups of primary, intermediate and secondary schools. Each study will be regularly evaluated over its duration, and the results obtained will be used to assist in the formation of a nationwide policy for the use of computers in schools.

PHILIPPINES

Two years ago, the government launched the 5-year Philippine Development Plan for 1983-1987. The major goals are: sustained economic growth; equitable distribution of development gains; and total human development. To achieve these goals, efforts have been made to increase the mutually reinforcing effects of the industrial, agricultural and service sectors, e.g., the educational system, to attain a more balanced growth.

In turn, the Ministry of Education, Culture and Sports reacted to the development goals of the government by undertaking a number of reforms in the school system which, among others, are:

1) evaluating and upgrading the quality of education in the country;

2) reorientation of the curriculum in all school levels in order to match the demand and supply for manpower;

3) remediation of the disparities in educational opportunity; and

4) strengthening the system of educational management.

These thrusts provided the impetus to search for and try out a number of practical, relevant and efficient learning systems. Eventually, the role of educational technology was recognized in helping to achieve the aforementioned educational reforms.

Some uses of educational technology. The Ministry, consequently, implemented the 5th Education Project – the Educational Radio Technical Assistance Pilot Project to generate guidelines for possible adoption of a cost-effective media-based educational delivery system. Preliminary findings have shown that the radio is a very useful medium in teaching Filipino, the national language, to elementary school pupils and has increased the appreciation of the Filipino culture.

Related educational technology activities of the Ministry include the development, production and transmission of radio broadcast lessons for primary school pupils and teachers. This project provided the Ministry with useful experience in media-assisted instruction. The experience gained, plus other relevant information, has served as a basis for the emphasis and direction of a large scale educational technology programme.

Teacher training in educational technology. The Philippine Normal College, one of the teacher education colleges, has recently revised its pre-service teaching and practicum programme in order to enrich the professional laboratory experiences of their students. One of the new features being adopted is a series of micro-teaching sessions that were conducted and recorded through the use of the VTR system. Replays of the recordings made during the micro-teaching sessions provided the student teachers opportunities for self-analysis of their teaching behaviour. Before undertaking their micro-teaching activities, the student teachers viewed several video tapes of teaching demonstrations that were performed by expert teachers in the professional education courses. The expert teachers demonstrated a number of models and episodes of teaching in actual classroom situations.

A graduate programme for Master degree in Education with specialization in educational technology is being offered in the College of Education, University of the Philippines. This is an advanced graduate study in educational technology to produce experts in areas such as: instructional/training system design, demonstration or analyses of various instructional/training methodologies with emphasis in the effective use of educational technology, production of different types of educational media materials, and management of educational media centre programmes.

Problems. Notwithstanding the strong interest being shown in all sectors of the educational system in the country to use educational technology, lots of problems have been met. Basic to these problems is the limited quantity of available educational media resources. The majority of the teachers do not have sufficient competence in the appropriate use and maintenance of the sophisticated media equipment. The distant locations of the schools and homes of the pupils, e.g., those in far islands and remote villages, pose a great problem for the clear transmission

of educational broadcast programmes. In addition to problems regarding clear transmission, there are, at present, few available broadcast programmes that would be directly useful or immediately available for use of the teachers.

Computers are generally accepted to be of tremendous value for facilitating research, computation, logical thinking, and communication. The Ministry of Education is strongly interested to bring computers into the classrooms. Meanwhile, observations and surveys have shown that most teachers and school administrators in the field have very limited knowledge about the use and operation of computers with regard to the different aspects of teaching and learning.

Research and innovations in educational technology. Educational technology implies educational innovation. However, extensive adoption of educational technology necessitates extensive financial support. For the moment, research is being carried out in order to ascertain the cost-effectiveness of educational technology in terms of promoting more effective learning, increasing the relevancy of what was learned, reducing the cost of education, and serving different types of learner groups more effectively.

The different educational media programmes of the Ministry are being carried out at national, regional, divisional, and district levels by the National Educational Media Centre, which is responsible for all the programme activities from planning to evaluation.

Future plans. In August, 1985 the parliament, and the Minister of Education, approved the organization of the National Council for Educational Research (NCER) which, among other activities, is to co-ordinate studies, policies, and the implementation of research and innovations in education. Foremost among the thrust of the NCER is a feasibility study on the use of computers in schools.

REPUBLIC OF KOREA

In the Republic of Korea, the concept of educational technology has been evolved over a couple of decades in order to make the learning environment more efficient and effective. Since the programmed instructional materials as well as simple audio-visual aids were applied in the classroom in the early 1960s, the concept of educational technology has been widely expanded in recent years to systems approach and multi-media approach including radio programmes and educational television. In addition, the interest in computer-based instruction has rapidly emerged. We are now at the turning point, shifting from the conventional technological approach to the approach of micro-teaching and computer application in the teaching/learning process. Accordingly, serious considerations are given to revitalizing the basic concept and to establish practices of the application of advanced educational technology. Currently, the educational technology courses are included in all the pre-service and in-service teacher education programmes, which is also required for obtaining a teacher's certificate.

The primary utilization of educational technology revolves around the following broadcasting programmes:

Teachers and their use of educational technology

The Korean Educational Development Institute's (KEDI's) radio and TV school broadcasting programmes are intended for pre-school children, elementary, middle, and high school students and teachers and parents. These programmes cover subjects such as Korean language, science, social studies, English, mathematics, music, fine arts, ethics, history, geography and health. Currently, 49 TV programmes and about 100 radio programmes are produced by KEDI every week. These programmes aim to enrich the learning experiences with various learning materials, and to improve instructional methods by providing quality materials. Radio programmes are broadcast for four hours daily (1,000 to 1,400 hours) for direct classroom use at the elementary school level. The length of each programme ranges from 15 to 30 minutes. TV programmes are also broadcast for three and a half hours every evening.

The Air and Correspondence High School (ACHS) provides secondary education to youths who are unable to receive high school education after finishing middle school. ACHS was attached to regular high schools which provide facilities for classroom instruction. The number of students enrolled in these high schools in 1984 was 5,461. Development of educational materials, curriculum/textbooks, test instruments and self-learning materials are carried out by KEDI. KEDI also produces the radio programmes for ACHS and conducts research and surveys to improve the quality and effectiveness of the air and correspondence programmes as well. Courses are conducted through self-study, radio lectures, school attendance and classroom instruction. Lessons are broadcast in the early morning (05:00-06:00 hours) and in the late evening (21:30-23:00 hours). Every day, except Sunday, there is a half hour lecture for each grade, covering two subjects. Classroom instructions are published bi-monthly for the students to enable them to have some contact with teachers and to have opportunities to clarify the content of the material which is difficult to comprehend while learning through self-instruction and radio broadcasting.

The Korea Correspondence University (KCU) was reorganized as an independent, degree-awarding five year university in 1982. A Textbook planning committee of the university is responsible for compiling and publishing all the necessary books and other supplementary reading materials. Instructions at the KCU include classroom instruction and self-study at home. Radio lectures are transmitted through the FM radio network of the Korean Broadcasting System (KBS) for home instruction and self-study. Broadcasting hours cover weekdays and Sundays. During summer and winter vacations two weeks classroom lectures are given at 34 universities and colleges.

KEDI conducted an evaluation survey in 1982 regarding the utilization of instructional media in primary schools. According to this survey, primary schools are not sufficiently equipped with various audio-visual aids. Furthermore, even the available audio-visual aids are not frequently used in classroom teaching. The data on the use of KEDI-developed school broadcasting programmes shows that almost 5 per cent of the primary schools use the radio programmes and 25 per cent the TV programmes. TV programmes are used by 37 per cent of the high schools. Computers, as well as other audio-visual materials are not included in this survey.

Interviews with teachers and principals show that computers and audio-visual aids are not fully utilized in classroom teaching. Many teachers do not know how to operate computers.

Some important reasons for teachers not using educational media are: lack of software; lack of hardware equipment, such as TV, radio, computers, etc. Another difficulty is lack of portability of educational media; teachers being afraid of losing or damaging hardware, lack of skills for operating the equipment, limited availability of electric supply and frequently poor quality of media.

Pre-service teacher training is carried out mainly in teachers' colleges and colleges of education in universities. Currently, some universities run courses in educational technology in their curriculum. These courses include:

In-service training activities are carried out by The National Institute for Educational Research and Training and The Provincial Institute for Educational Research and Training. The Korean Audio-visual Education Association provides media techniques skill training for all levels of teachers on a voluntary basis.

The major problem faced in improving the teacher's competency in educational technology is that the latest teacher training programme is not practically oriented. Most of the teacher training programmes are quite superficial and theory-oriented. As a result, the implementation of advanced technology becomes very difficult, due to the teacher's low level of competency.

Some other problems related to the implementation of the advanced educational technology have to be reflected in the future planning. Firstly, for the effective use of media technology in education there is a paucity of trained personnel in this field. In each teacher training activity, a technological approach should be introduced and professional teachers must be trained for the application of technology. Secondly, in the pre-service and in-service teacher education, the time assigned to educational technology and instructional methods has a very low ratio compared with the total number of training hours in the pre-service/in-service programme. Thirdly, some of the teachers have a quite skeptical view of the value of educational technology. Therefore, it is very important to promote teacher awareness of the use of educational technology. Fourthly, teachers have limited time to study the application of educational technology due to a heavy teaching load. Finally, there is a shortage of proper equipment and media resources which are required for classroom teaching and the development of materials should be promoted in each school. Sufficient resources should be provided to maintain those facilities.

SRI LANKA

School education in Sri Lanka spans 13 years comprising primary level – kindergarten + grades I-V (6 years); junior secondary level – grades VI-X (5 years); and senior secondary level – grades XI-XII (2 years).

Educational inequality is a current problem and the policies are oriented towards reduction of the imbalance in the distribution of educational facilities

among various districts. To lessen the problems it is necessary to provide suitably qualified teachers to rural areas. The lack of adequately qualified teachers especially at senior secondary level for teaching science subjects and mathematics has led to the need to promote the use of educational technology.

It has been necessary to supply more science equipment to junior secondary schools and develop and produce low-cost educational technology materials. The establishment of the National Television Centre has placed a greater stress on use of mass media in education. Radio broadcasting for schools is provided by the Education Service Division of the Sri Lanka Broadcasting Corporation. Telecasting of formal educational television programmes for schools started in May 1983. Educational television programmes of twenty minutes duration are produced for physics, chemistry, botany, zoology and mathematics for senior secondary level students. In each of these subjects 48 instructional television programmes are planned. All programmes are produced in the Sinhala and Tamil languages. The scripts are provided by the Curriculum Development Centre and production is undertaken by the ETV unit of the Sri Lanka Rupavahini Corporation (the National Television Centre). Senior secondary schools teaching science and mathematics are provided with at least one colour television set. About one third are provided with a video cassette recorder. Teachers are provided with the transmission time schedule and teachers' guides.

In accordance with a proposal made by the Ministry of Education, a microelectionics education programme was initiated as a pilot project in 1984. Six training centres were set up in schools. About a quarter of senior secondary schools teaching science subjects and mathematics are supplied with microcomputers and related software materials. The main objective of the project is to enable students of the senior secondary level to become acquainted with microcomputers and their application in daily life.

Before the official broadcasting of ETV, the media co-ordinators of all the 456 senior secondary schools were given training in the proper use of ETV programmes. Subsequently teacher educators and 24 media co-ordinators from all educational districts were further trained. By May 1984, about 200 personnel, including teacher educators and classroom teachers were trained under the microelectronics pilot programme and a draft syllabus on "computer awareness" for use of computers was prepared.

One of the problems related to the effective use of educational technology is that the broadcasting hours do not coincide with school timetables. Due to the fact that many schools are overcrowded, they lack a separate room to install the equipment. This has hampered the proper use of ETV programmes. There are insufficient facilities for maintenance and repair of the equipment. Many teachers still lack the proper skills to handle the equipment. Many teachers do not know how to integrate the educational technology methods in classroom lessons. The conservative attitude of some teachers has led to a very low rate of use.

A new major programme of the Ministry of Education is the setting up of a National Institute of Education (NIE). This institute will keep the total general

education under surveillance and will formulate suggestions for meeting national educational needs. It will also co-ordinate the educational development and teacher training activities of the Ministry, and monitor and evaluate the performance in all above areas.

ETV programmes will be redesigned after evaluation by qualified specialists. ETV programmes will be produced at the Media Centre of the Curriculum Development Centre for in-service training of teachers and some for school use. Also the required special knowledge of media co-ordinators will be updated.

Microcomputers will be supplied to the schools teaching science subjects and mathematics and special upgrading courses on computers use for teacher educators and for classroom teachers are also planned to be conducted at the six training centres. A teachers' manual on the use of educational television programmes will be published and distributed to all schools.

Multi-media packages consisting of teachers guides, printed materials, charts, slides, audio-recorded cassettes, and also video cassettes will be designed in the near future. Professional support-services are needed to facilitate the designing, production, and utilization of these packages.

Several problems in classroom use of educational technology can be overcome by proper guidance given to the teachers during their pre-service and in-service training.

THAILAND

Most of the teachers in Thailand are becoming increasingly aware of the effectiveness of educational technology in enriching the teaching/learning process. The educational technology media utilized in Thailand can be classified into four main groups: non-projected, projected, audio-visual, and programmed teaching aids.

Besides this, educational radio broadcasting programmes are offered by a government system and some private broadcasting systems. The governmental broadcasting system is operated by the Educational Technology Centre of Non-Formal Education Department, Ministry of Education.

The government radio broadcasting system offers educational programmes from the Ministry of Health; Sukhothai Thammathirat University (Open University); the Ministry of Education; the Ministry of Agriculture and Co-operatives; and the Public Relations Department.

The Ministry of Education broadcasts the school radio programmes during fixed time schedules for elementary and secondary schools. These broadcasts are offered 5 hours a day, five days per week, and 32 weeks per year. They cover elementary school mathematics, Thai language, social studies, career education, arts and ethics, physical education, music and drama and English language. The programmes for secondary schools include English language and vocational guidance.

Most of the media centres or educational technology centres have a training project for in-service training, aiming to promote the use of educational technology

by teachers. The in-service courses are in the form of weekend seminars, workshops, short-courses or summer courses. These are organized at national level as well as at the sub-centres and the universities. The content of the courses is similar to some pre-service training courses in educational technology.

There are many colleges and universities which provide pre-service training courses. Some universities offer a degree programme in educational technology, for example, Chiang Mai University, Chulalongkorn, Kasetsart, Khon Kaen, and Srinakharin Wirot University.

For the teaching of science, the teachers have been trained in the use of science equipment which is produced by the Institute for the Promotion of Teaching Science and Technology (IPST). Srinakharin Wirot University and other universities, which prepare science teachers promote the utilization of locally available materials and resources in teaching science.

The delivering of effective primary and secondary education to millions of school-age students in Thailand is hampered by a shortage of textbooks, stationery, adequate instructional aids and equipment to carry-out teaching-learning in line with the new curriculum; budgetary constraints affecting the supply of appropriate equipment; old-fashioned approach in teaching and lack of teachers' awareness of the demands of the new curriculum; and the teachers' lack of experience in developing self-made teaching/learning materials.

In order to solve the educational problems and to improve the quality of teaching, the following plans for development are recommended:

1. Regular provision of the necessary educational equipment, materials and supplies to all primary and secondary schools.
2. Improvement in the educational television programmes, using the available transmission facilities of the existing TV stations.
3. Production of educational materials (printed materials, audio-visual aids, educational films, slides, and other related materials) to support the radio and television services, as well as for classroom use.
4. Co-ordination of the activities of all concerned agencies at national, regional and international levels in matters relating to educational technology.
5. Provision of more in-service training for teachers on the principles and utilization of educational technology.
6. Carry out evaluative studies on the effective use of educational technology at all levels.

Synthesis of country experiences

The brief presentation and discussion of country experiences brought forth several major issues, growth points, concerns, problems and needs, as well as various innovative practices developed to overcome these problems. In general, educational

technology is implemented as a total system to tackle various educational problems rather than as a mere application of some new technology.

The countries experiences show that in many countries low – cost teaching aids, locally contrived materials and the use of the environment for meaningful education of the learner are largely used. The new developments in educational technology lead to their usage not as substitutes for these low-cost educational materials, but as a built-in part of the instructional process. The use of audio-visual aids through various means and also the use of computers for information processing are an extension on the continuum of instructional materials.

Some national institutions and departments for developing educational technology in the educational systems have been established in some of the participating countries. Production units for developing projected, non-projected, audio, video, programmed materials are in operation in many countries. In some of the countries Learning Resource Centres have been created to provide teachers' access to the educational technology materials. Satellites are used to telecast educational programmes to remote, rural areas and far flung coastal belts. Radio broadcasting for students and teachers has also been introduced in some of the countries. Open schools and universities have been established. A recent arrival in the galaxy of educational technology materials is the computer.

The country experiences also revealed that educational technology can be of help in the processing of information, presentation of concepts, introducing modern methods of teaching and increasing the learning potential of the pupils.

A synthesis of the country experiences also revealed the following problems in the expansion and extension of educational technology:

1. verbose teaching-learning practices in the classrooms;
2. lack of teacher competence in the use of the various educational technology materials;
3. low level of teacher confidence and lack of commitment for using the media;
4. rising costs of hardware materials and costs involved in production of materials and programmes;
5. shortfalls in the targets of production and consequently last hour changes in the transmission schedules;
6. problems of maintenance of the hardware;
7. lack of trained production personnel and inadequate production facilities;
8. absence of professional acculturation in the teachers to grow with the advancement in other sectors of society; and
9. low level of awareness among educational administrators, policy makers, curriculum developers and the general public at large on the advantages of using educational technology.

Chapter Two

METHODS USED IN THE PREPARATION OF TEACHERS AND TEACHER EDUCATORS

While in many developing countries advanced communication technologies are being effectively utilized in various fields, it is still a common phenomenon that these technologies are under-utilized in schools, observes Dr. Se Ho Shin, Vice-president of the Korean Educational Development Institute.*

Children of the 20th century are bombarded with technological devices such as television, computers, and video tape recorders. Education needs to embrace the pervasive impact of technologies and utilize such technological devices effectively in schools.

The above observation calls for the use of various modalities which would promote a more effective use of educational technology in classroom teaching.

In education, contemporary teachers witness every day the emergence of innovative educational hardware and software, and these newly developed technological devices demand new educational forms and practices. Traditional methods such as the delivery system which depends entirely on teacher's explanations need to be changed and reformed. The future of the society depends on today's education, therefore the effectiveness and the productivity of education become increasingly important. A highly productive and effective education does not mean that it excludes the quality aspects such as goals and content of education. It rather means harmonized effort to interweave the desired goals of education with prescription of methodologies.

Before considering various modalities for preparing teachers and teacher educators for extensive use of educational technology, the following three questions need to be considered:

1. What are some of the new educational technologies that demand reforms in teaching and learning in schools?
2. What are the problems and issues of incorporating and applying these new technologies in schools?
3. What are the implications and prospects of new technologies and education?

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* "Advanced Communication Technologies and their educational use" – paper presented by Dr. Se Ho Shin at the Tenth World Confederation of Teaching Profession (WCOTP) Asian and Pacific Conference, August 1985, Seoul, Rep. of Korea.

New educational technologies, demand reforms in teaching and learning

In recent times, films, records and transparencies have been used in teaching. Many students are at present studying through radio and television, other electronic media, video tapes, telephones and satellites.

The emergence of newly developed technological devices such as video disks, microcomputers, computer graphic display terminals, electronic terminals and low-cost terminals is demanding instructional reforms. It is working as a powerful stimulant for the creation of new and innovative instructional techniques and methods. It is also helping to expand educational opportunity to everybody.

From radio to satellite, there is a wealth of communication technologies that can revolutionize education when properly and wisely utilized. Some educators in many countries have been ignoring the educational technologies because of the disappointment they have had due to the haste and immature application of the technologies to education. Only when they are rightly utilized can the true worth of such devices be appreciated.

Educational television broadcasting and the use of video-tapes has revolutionized the teaching/learning process from pre-school education up to tertiary level education, and non-formal education for the out of school population. In this area, a new development in video production technology makes production of television programmes for education much cheaper. For example, the computer animation system developed in recent years is lowering the cost of programme production when compared with that of hand animation technique.

Video cassette recorders (VCRs) and the use of video disks contributes to relieving students from the tiresome process of taking notes from dictation. VCR enables the students to copy instructional programmes off the air and play them back at some later time.

Computer-assisted instruction is the newest educational technology. A student sitting at a computer terminal works through a series of "frames" that teach and test understanding. If the student is progressing slowly, the computer branches to an alternate style of presentation or a remedial section. If the student has mastered that section, the computer jumps ahead to more advanced material.

The video disk is a good example of how new technologies can be combined to form an instructional system. The video disk contains an extensive database of text, still images, and film. The computer controls the sequence of presentation and, using an educational programme contained on its floppy disk and information stored in the remote database, interacts with the student.

The video disk, for example, might contain several thousand images of microscope slides. The database would have full descriptive information on the subjects illustrated by the slides, indexed in various ways.

Educational software on the computer would take a student through sequences of slides and text presentation, providing information and administering

tests. While the computer programme would be designed to achieve a specific instructional purpose, the slide catalogue and database would be intended to be more widely applicable for research and education.

Problems and issues in applying advanced educational technologies in schools. As observed by Dr. Se Ho Shin, most of the educators and policy makers in many developing countries still think that such technologies belong only to rich countries. The main problems and issues in applying advanced technologies in schools, identified in his paper, are:

The attitudinal problems and issues of educators and educational policy and decision makers. When teachers, who are supposed to be the leaders in education themselves, are unfamiliar with technological devices and shy away from using such gadgets, no progress will be made in incorporating technologies in education.

It was realized, that in most countries there is a strong need to train teachers how to effectively use this media. The experiences of most of the countries reveal the need to develop better programmes in educational technology both for the pre-service and in-service education of the teachers. Since there is a variety of media available, short courses on the different aspects are strongly required to meet the immediate needs. Three important considerations for training in the use of educational technology and a particular kind of media should be: access, competence and confidence. The sequence of training activities should be development of awareness, knowledge, attitudes, skills and competence. Practical training in the use of materials would ensure access and generate confidence.

The problems and issues associated with cost. The cost issue, especially in developing countries, is the major area of concern when implementing innovation. Policy makers, school administrators and teachers frequently think that such expensive technologies are a luxury. However, if meaningful educational results can be achieved through the use of technologies one should not hesitate to invest capital to such a task because it in fact raises the effectiveness of educational cost.

Problems and issues associated with transportability, availability and transferability of hardware and software of advanced technology. If one country depends on importing technology from another, it should study the various types of equipment available with regard to their overall suitability. Introducing a new technology against one's wish may increase the gap between advantaged and disadvantaged. It is important to note that some technologies may be usable only where the necessary conditions or services are available, e.g. availability of electricity, hardware, qualified maintenance personnel, spare parts).

Problems and issues associated with infrastructures, preparation and continued support. Often, inadequate analysis of the necessary conditions and of required infrastructures are the cause of disappointment from hurriedly implemented new technologies. Some of the basic technical infrastructure like availability of electricity at a steady voltage, repair and maintenance services, and trained manpower for technical maintenance for production of software are sometimes overlooked.

It is of the utmost importance to provide the necessary preparation and further upgrading of knowledge and skills of all educational personnel to use modern educational technology with competence.

No technology should be imported without considering the availability of spare parts and maintenance abilities.

Teachers should be adequately trained in trouble-shooting and simple repairs of the equipment which will be used.

New technologies and education. To many first-time users the introduction of new technology (e.g. computers, video or satellite) can be very intimidating and the general reaction is often resistance.

It is necessary to bear in mind the psychological impact on teachers and students if advanced technology is thrust upon them without properly planned orientation procedures. The real changes in the quality of education come from a better understanding of how children learn, what the goals of education are and how a community can achieve these goals.

With a view to the above considerations, the participants of the Regional Workshop on the Use of Educational Technology by Teachers considered various modalities for preparing teachers and teacher educators to more extensively use educational technology, as follows:

The Personalized System of Instruction (PSI) in the in-service training of teacher-educators and prospects for the use of multi-media resources*

The Personalized System of Instruction (PSI) was pioneered by an American professor who used it in his classes in psychology and later published his works under the title, The Keller Plan. This system of instruction is being tried out, on an experimental basis, in teaching a graduate course, EDP 250 – Statistical Methods in Education, at the College of Education, University of the Philippines. The majority of the students in this graduate course are teacher educators, school administrators, and master teachers. In the class, the students are encouraged to study their lessons independently, and pursue them at their own pace and level of readiness.

A syllabus of the course containing 18-20 sequentially arranged units/ modules was prepared by the course faculty. The syllabus was distributed to the students who are expected to accomplish the objectives, contained therein, on a contractual basis. The contract implies that a student must accomplish very satisfactorily the requirements of a preceeding module. Completion of at least 16 modules is necessary in order to pass the course.

Every module in the course is written in a similar format with these subsections: (1) learning objectives, (2) topics for study, (3) problem sets to illustrate each topic, (4) example solutions for each problem set, (5) additional problem sets, (6) suggested learning activities and multi-media resources.

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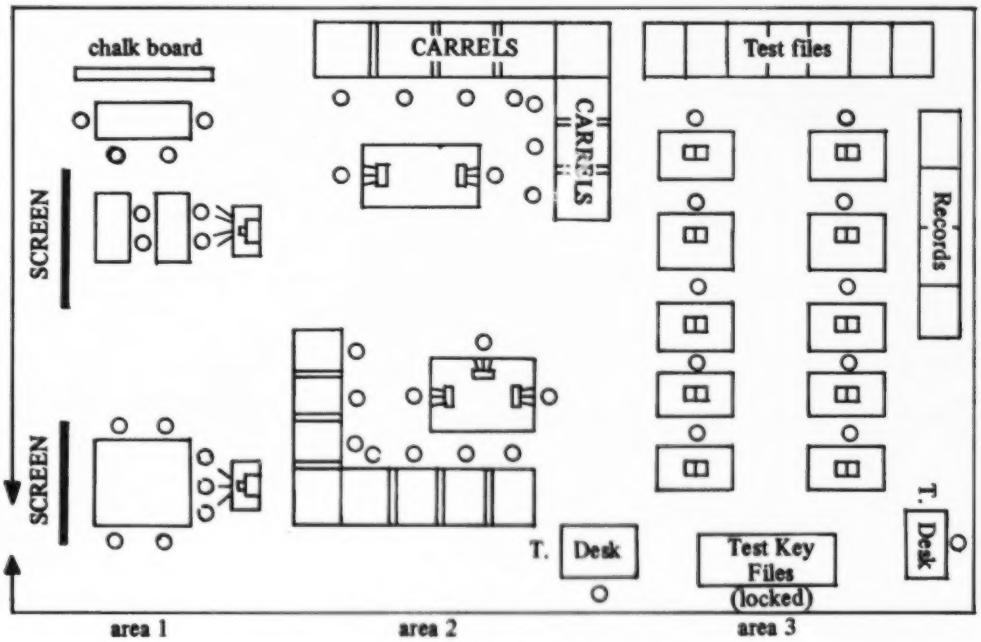
* Presented by J.B. Catillo.

The student is free to plan and do his preferred learning activities as well as use the relevant educational media resources. He may spend his class period inside or outside the classroom. He may go to study in the library, into the computer room, into the educational media center in the college, or consult with an expert in the subject matter. If he wants to be in the classroom, he goes into any one of the three sections or areas which are classified as follows:

Figure 1. Areas in the classroom where PSI is being used



It is in area 1 where expository instructions for small groups or individual tutorials are conducted by the faculty, by a resource person or by a teaching assistant. The usual media resources used during the expository instruction are projectors for films, slides, transparencies, and opaque materials; chalk-board, and models. Individual or small-group, independant learning activities are conducted in area 2. A student studying by himself or sometimes with others – uses calculators, computers, workbooks, audio or video recorders and other essential multi-media resources.

As soon as a student feels that he has sufficiently developed the competencies that are expected in the module which he has on hand, he goes to area 3. It is in area 3 where the achievement tests for each module are taken.

Every module in the course is supplemented by an achievement test of about 5-8 parallel forms with at least 5 items. A student must have 4 or 5 correct answers in order to receive a pass-grade for the module. The test answers submitted by the student are corrected immediately by using a prepared answer key. If the error committed by the student is computational, he receives partial points for the item, but is

asked to discover the source of and rectify his computational errors; then he is allowed to move on to the next module. The wrong answers, which reflect unclear, or insufficient understanding of the concepts and processes relevant to the problem set, are considered substantial errors. The student who is evaluated to have committed a substantial error is told to study the module again. He is advised to read other references, use other types of educational media, seek futher consultations or tutorials, in order to achieve more in-depth understanding of the topics in the module. The student may study a module as long as he desires. The length of time to be spent for each module is at the discretion of the student. What is basically required of the student is to pass the achievement or post tests in 16 out of the 18 modules during the semester in order to pass the course.

The observations of the PSI class reveal the existence of the following learning and instructional situations:

1. There is maximum freedom of the student to plan, pursue, or revise his learning activities.
2. Varieties of instructional learning activities, e.g., expository, interactive, and independent models are used.
3. Multi-media educational resources are extensively used.
4. A student takes a test when he feels ready to take it.
5. Immediate feedback of the student's test performance is done. Every time a student takes a test, his answers are immediately corrected and evaluated. He is then informed, and advised about his test performance.
6. There is maximum opportunity for group and individual learning or for co-operative as well as competitive learning activities.
7. The faculty generally performs a managerial role.

An example of the use of educational technology in providing an in-service training programme, in the teaching of reading, for primary school teachers.*

In 1978 in New Zealand, approval was given for the development of the Later Reading In-Service Course (LARIC). The purpose of the course is to improve the teaching of reading to children in middle and upper classes of the primary schools. The programme aims to increase teachers' understanding of their pupils, and of the reading process, to heighten their enthusiasm, and to offer practical ideas for use in the classroom. The use of video tape as the chief means of presentation for the teachers' course, which is available on a national basis, is a major innovation in the in-service training of teachers in New Zealand.

Members of the development team were drawn from the ranks of teachers, advisers, and teachers' college lecturers, with the project being based at Christchurch

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* Presented by B. Hennessey.

Teachers' College. The project was started with a research study which examined teaching practice in relation to reading in middle and upper primary classes. The research findings guided the selection of content, and the emphases made and the kind and level of presentation. Throughout the development, there was regular consultation with teachers and representatives of the primary teachers' organization, and with reading specialists in teachers' colleges, the universities, and the Department of Education.

LARIC consists of ten units presented, at weekly intervals, to groups of up to ten teachers at small centres in vacant classrooms. In essence, the programme has recorded on video tape and in booklets the practice of some teachers in teaching reading. Videos have been made of teachers at work in many parts of New Zealand, in large urban and small rural schools, paying due regard to the culturally different. Typically, presentation of each unit involves the group of teachers in viewing a video-tape, and then discussing the ideas, presented with each other, and with a tutor associated with the programme. This is followed by reading and discussion of the unit booklet, a copy of which each teacher then takes away as a permanent source of practical ideas. Time is also provided for the teachers to become familiar with up-to-date teaching materials displayed at the centre.

In about one year's time, it is planned to complete an evaluation of the effectiveness of the course by carrying out research on the practices of teachers and the reading behaviour of pupils, and comparing the information gained with that resulting from the baseline study which initiated the project.

Education Resource Centres

The Education Resource Centre is an institution in which teachers have access to modern technological equipment and facilities to help them in their teaching. In Malaysia this is an innovative method of decentralization of educational activities to allow teachers throughout the country to become involved in curriculum development and to promote the effective use of educational technology. The Educational Resource Centres also provide in-service training for teachers in modern educational technology techniques and methods so as to improve their professional competency and to fulfil better the educational needs of the pupils. The objectives of the Education Resource Centres are to:

a) improve the quality of education in disadvantaged areas, so as to help teachers in their teaching;

b) expand and strengthen the in-service training of teachers in order to upgrade their competence and skills for proper use of educational technology and in other related topics of curriculum development;

c) assist and promote the design, development and production of other curricular materials; and

d) disseminate information on innovations in education to school teachers.

The Educational Resource Centres are established to perform the following functions and activities:

a) give advice and guidance to teachers relating to the proper use of educational technology and curricular materials;

b) provide media materials to schools on loan, and supply the teachers with information on existing materials and let them review or try them;

c) provide the services of graphic artists and the facilities for reprographic production, printing, photocopying, duplicating of Radio and TV programmes;

d) plan and conduct in-service-courses for teachers in the use of educational technology; and

e) provide facilities for teachers for performing other professional and social activities such as workshops, seminars and public campaigns.

To enable the Educational Resource Centres to function effectively, they should be equipped with resource materials and equipment for reprographic and other facilities which are not readily available in many schools for use by the teachers. Besides the establishment of an Educational Resource Centre at state level, its services should be further expanded through establishing District Educational Resource Centres so as to enable more teachers to receive their services.

The use of educational technology at school level has to be co-ordinated by the organization of school resource centres, so that all materials that are made available will be identified, stored and distributed in an organized, centralized management system. The support of all the staff in this organization is of utmost importance to make the school resource centre a success. This school resource centre is an invaluable asset in promoting the effective use of educational technology by teachers in the long term.

Use of appropriate educational technology

Information processing is a basic feature of education. The recent breakthrough in communication systems has provided a variety of media materials for use in education. Simultaneously, new teaching methods have emerged which increase the effectiveness of the teaching/learning process. The combined application of methods and media have generated a new area of educational technology which aims at optimising learning outcomes by systematizing the process of instruction. The availability, the know how and proper use of a particular media depend upon the level of technological development of the society. No doubt, sophisticated media have high communication potential but instead of waiting for such a day to come, it is always sound to train the teachers in the use of locally available resources. In fact, every community has its own developmental level which is continuously being enriched by new developments.

Distance education in educational technology

In New Zealand the Advanced Studies Unit is one of the major agencies catering for the continuing education of teachers and other adult learners. It is a distance education teaching department within the Palmerston North Teachers College, with a core of permanent professional tutoring administrative staff. The tutoring of many of the courses is done by teachers' college staff throughout New Zealand.

A wide range of distance education courses is offered which are intended to provide professional qualifications for teachers, from initial pre-service to advanced Diploma qualifications. The papers enable teachers to obtain specialist qualifications, and also provide opportunities for teachers to broaden their knowledge by studying new subjects. At the most advanced level, the intention is to include papers which will enable teachers to pursue subjects in increasing depth.

Most Diploma courses consist of single independent papers. Each paper has an introductory booklet and usually six study guides. A paper involves students in about four to five hours of study, reading and assignment work per week over 30 weeks each year from March through October. In working through assignments, students acquire knowledge and develop the skills of selection, interpretation and presentation of information. Some assignments may take the form of regular essays, or practice exercises, while others may require practical work. Assignments are commented on by experienced tutors and returned to the student with suggestions and constructive criticism. All work is formally assessed to enable students to gauge their progress.

Access to specific course-related material is often difficult to obtain for students studying at a distance. The Palmerston North Teachers College library offers a postal service designed to overcome some of these problems. Prescribed textbooks may not be borrowed as students are expected to obtain their own copies. A library guidle for Advanced Studies for Teachers Unit students, detailing extramural library service and procedures for borrowing material, is sent to all enrolled students.

Every effort has been made to design the courses around equipment that is readily available to schools, although occasional students might have to make efforts to visit a larger school or Resource Centre to use a few of the items. A residential vacation course is usually included and candidates are advised to attend any other suitable in-service courses available to them. Several courses on educational technology are offered to teachers. Following are two examplars of the course outlines for two such courses:

I. Educational Technology

Aims

1. To develop a rationale for using audio-visuals (AV);
2. To develop confidence and competence in using AV;
3. To develop organisation and management of AV resources.

Course intended for

All teachers interested in improving their use of AV in learning and teaching.

Course description

The major topics are:

a) the contribution of AV to learning and teaching;

b) graphics, reprographics and non-projected visual aids;

c) projected materials – OHP, slides, film;

d) audio materials – cassette recorders, recorders, radio, listening posts;

e) planning an AV sequence using image and sound; and

f) individualized instruction, programmed learning, computer assisted learning.

Special features

Students will be required to have or purchase a variety of AV software materials for use in practical assignments.

II. Media Studies

Aims

1. To develop an awareness and understanding of the influence of media in society;
2. To develop a critical approach to the choice of media for learning and teaching;
3. To extend the ability of teachers to use media in curriculum areas; and
4. To acquaint teachers with popular media that they might otherwise ignore.

Course intended for

Teachers at all levels.

Course description

The main topics are:

a) media and the learner, communications theory;

b) print media including comics, pulp literature and newspapers;

c) film, teaching with film, teaching about film;

d) sound, radio/tapes/records;

e) television, teaching with television, teaching about television; and

f) multi-media and resource centres.

Special features

Students will be required to critically view and comment on a variety of media, particularly comics, science fiction, literature, film and television. The major assignment will consist of a journal recording reactions to this material.

An approach to teacher training in educational technology

In Thailand there are two forms of networking at present being used to assist in the development of educational technology in pre-service and in-service teacher education.

Internal networking. The first is the networking of the teachers colleges. Thirty-six colleges in the Kingdom form eight consortia based on geographical location. The Chairman of each consortium is elected from the presidents of the colleges in each group, and the chairmanship is rotated every two years. The main responsibilities of each consortium are to:

a) determine the manpower needs in the region through research conducted by the colleges, with the researchers being appointed by the consortium;

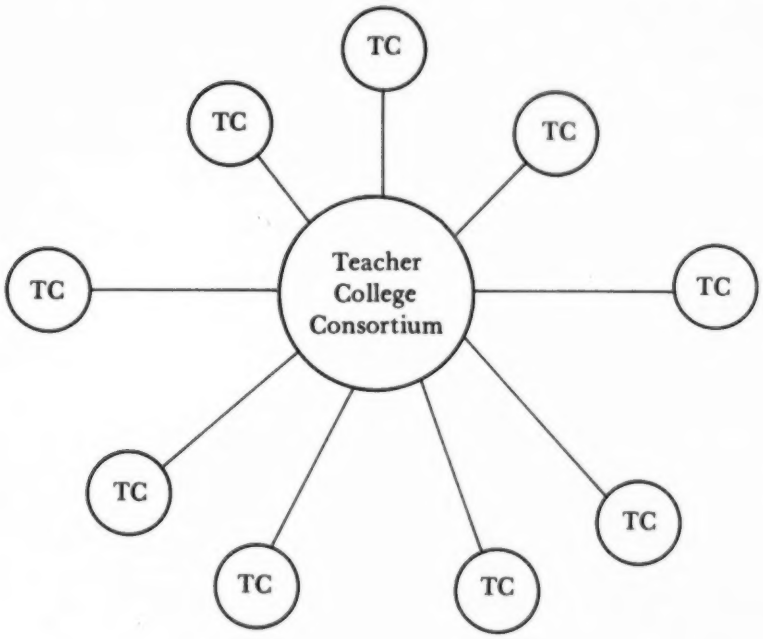
b) plan educational programmes to meet the determined needs related to in-service training, research, promotion of folk culture and academic services in the local communities;

c) discourage duplication of programmes, projects, and activities of the colleges within the consortium;

d) pool and utilize the financial and human resources to help each other; and

e) assess the management process and activities of the consortium and the individual member colleges.

Teacher College Consortium



1. Survey of the needs in the region.
2. Planning of educational programmes.
3. Avoiding duplication.
4. Pooling the resources.
5. Evaluation.

External form of networking. This is a co-operative venture between the Department of Teacher Education, the regional universities and other government agencies. The purpose is to help each other to make educational activities relevant to the local community needs. The structure of the administration can be described as follows:

1. Department of Teacher Education and the university form an executive committee to draw up policies and approve the proposed plans, projects or activities. The chairman of the executive committee is either the Director-General of the Department or the university president. Members of the committee are college deans and the presidents of teachers colleges.
2. In the teachers colleges there is a co-ordinating committee working with an executive board, co-ordinating the programme at the local level.

3. There are implementation teams which comprise the faculty staff from the teachers colleges and the universities. The implementation teams are set up to carry out the approved programmes. The following teams operate under this scheme:

   a) The rural development programme, in which university and teachers' college teams work to train vocational and technical personnel who are working in rural development projects.

   b) Research programmes which are jointly conducted by the team to develop substitute energy and local technology for local use.

   c) Folk cultural promotion. Under this plan, the mixed teams from teachers' colleges and universities are developing radio and television programmes to disseminate folk culture. Some particular dialect dictionaries and encyclopedias are being written and produced.

   d) College staff development is one project planned under the co-operation scheme. The teachers' college will send their staff for short-term training for a particular purpose or long-term training for an advanced degree level.

   e) The programme for developing instructional materials for college teaching is also an on-going activity.

   f) The in-service training of teachers and educational personnel is another of the co-operative efforts between teachers colleges and the regional universities.

The different approaches, described above, provide a structure for the development and implementation of pre-service and in-service courses for teachers in educational technology.

Chapter Three

IMPRESSIONS OF VISITS TO AN INNOVATIVE PRIMARY SCHOOL AND AN EDUCATIONAL TECHNOLOGY HARDWARE ENTERPRISE

Han Nam Elementary School in Seoul

School Organisation. Han Nam elementary school has a teaching staff of 60. The principal is assisted by two vice-principals, and twelve senior teachers are each responsible for a small group of teachers at the various grade levels. There are 51 classes in the school with an average of 50 children in each.

Use of educational technology. Han Nam is an experimental school which is promoting the use of educational technology in classroom teaching. The range of audio-visual aids and facilities include:

- Fifty four colour television sets
- Seven VTR units
- A VTR library which has a stock of 320 video-tapes
- A television production studio with a VTR camera and six different sets for lighting
- One 16mm cine projector
- Several slide/filmstrip projectors
- Three radio sets
- Twenty four microcomputers
- A number of cassette players

Observations. The workshop participants were impressed with the positive attitude the pupils showed towards their class work and the caring warm approach of the teachers towards their pupils. The following are some of the activities observed by the workshop participants.

Television production

A class of grade V children had been studying a traditional Korean folk tale; reading, writing and drawing about the story and the characters. Their study was facilitated by a special script for television production. The participants could observe the children, dressed in bright colourful costumes during the filming of the programme.

Teachers and their use of educational technology

Woodwork

The pupils of a grade VI carpentry class were involved in measuring, sawing and painting the components for small boxes they were constructing. These boxes are designed for storing the national flag in the children's homes.

English

All classes have a 20 minute English lesson every day. The participants observed several classes during this lesson in which television was the medium of instruction. The programmes at the appropriate level are broadcast to the classrooms from the school's own television studio.

Science

Educational technology is extensively used in the teaching of science. Different classes were visited and the workshop participants were able to observe the use of 16mm film projection, filmstrip projection, play back of audio cassette recordings, demonstration of charts, diagrams and children using special equipment in conducting experiments.

Microcomputers

In a room specially set up to accommodate the school's microcomputers, a grade IV class was learning basic computer programming during a mathematics lesson. The children were active participants gaining valuable hands-on experience. There were sufficient microcomputers in the room so that only two to three children were working on each.

The life experience area

Behind the school a very stimulating environment has been created on an open hilly space. There are a series of agriculture and horticiture plots which are carefully tended by the children. They grow fruit trees, vegetables, grains and flowers. A small caged area houses a variety of poultry including bantams and peacocks. A gentle little stream flows down the hillside and here one class was conducting science experiments in the principles and function of watermills. Another class was making moulded clay masks which the children were painting and decorating.

Special Features of Han Nam Elementary School.

a) The school teachers believe very strongly in the development of the whole child.

b) Twenty minute lessons are given to all children each day in spoken English and in Chinese characters writing.

c) The school, established in 1907, has a very close relationship with the local community. Many of the grandparents and parents of the children also attended the same school.

d) The children are able to select from a range of electives which are offered on Wednesday afternoons.

e) One third of the teaching staff are competent in using the television programme production equipment.

Samsung Electronics Co. Ltd.

The participants visited Samsung Electronics Company which is a vast electronics industrial enterprise located about 45 kilometres south of Seoul.

Ever since the company was established in 1969, it has strived to manufacture, both in Korea and abroad, various types of high quality electronics products and precision instruments.

It was stated by company officials that in 1984, it produced 2 million black and white TV sets, 2.4 million colour TV sets and 1 million video cassette recorders. This scale of production was considered by the participants as amazingly large even by international standards. Applying the latest advanced technology and technological innovations, this enterprise can produce electronic spare parts and equipment such as: the "Free Volt" automatic voltage stabilizer system; multi channel CATVs; PLL synthesizer tuning; NTSC/PAL/SECAM multi-systems, and other components for TV receivers and monitors.

A wide range of Samsung's home electrical appliances are also produced, such as refrigerators, humidifiers, vacuum cleaners, electric blankets and mats, electric rice cookers, telephone receivers, wall clocks and massaging machines. In 1983 Samsung's microwave ovens were selected as the "best buy" by Consumers Buying Guide; and "Award of Approval" was given by Good House Keeping, a widely-circulated and prestigious US magazine.

Along with those electrical appliances for domestic use, the company produces a large variety of educational technology hardware. These include high quality audio products, varying from portable radio-cassette players and compact audio systems, to sophisticated sound systems, like lazer beam record players, and equalizers. These audio products have useful features such as PLL express synthesizer tuning, feather touch controls, Dolby System NR, cassette auto-reverse, high-speed dubbing and built-in graphic equalizer.

Recently, the company started manufacturing various microcomputers, minicomputers, and personal computers including word processors, display monitors, printers, and floppy disk drives. It also produces digital calculators and electronic cash registers. Mindful of the importance of computer software, Samsung reached an agreement with Apple company, a leading US computer company, to jointly develop the latest computer software programmes.

A huge, well-equipped, Research and Development Centre is maintained by Samsung Company. This Centre is considered vital to keep pace with the very rapid changes in the electronics industry and for them to successfully compete in this line of endeavour. One of the future plans of their Research and Development Centre

is to strive for the development of videotex, satellite transmission and reception system, data processing system, computer peripherals, and extensive application of fiber optics.

The participants observed with deep interest, the electronic appliances and systems which were in the display counters of Samsung company. They discussed the prospective uses of these electronic products in facilitating the instructional and learning processes. The workshop participants were also aware of the fact that the different types of electronics such as audio and video systems, computers and satellite transmission and reception systems will play a big role in solving a number of educational problems or in helping to achieve the educational objectives in their respective countries.

Chapter Four

RECOMMENDATIONS

Improving the training of teachers and teacher educators to promote the effective use of educational technology

The participants expressed the need for revitalization and reform of present policies, systems and structures. This related to the production of various educational technology materials, and the inclusion of the necessary knowledge and skills for the development and proper utilization of a variety of media in the pre-service training and in-service upgrading of teachers.

Improvement and development of educational technology materials in education and their proper use

To ensure that teachers use educational technology properly, the following recommendations are offered for consideration and adaptation according to national needs and existing facilities:

1. Respective educational authorities should conduct feasibility studies on "what are the most appropriate educational technologies for each level of the educational system and for the training of teachers."

2. Educational Media Centres (EMC) should be organized by the concerned school authorities at national, state, provincial, district, and school level. Every EMC should be adequately supplied with the necessary facilities, media equipment and materials, personnel, and financial support.

3. The EMC should participate in organizing and be the venue for the following activities:

   a) storage, distribution, maintenance, and repair of media equipment and materials;

   b) design, production, trial and evaluation of various media materials and simple types of equipment; and

   c) seminars and training workshops on design, utilization and assessment of various types of educational technology materials.

4. The following factors should be considered when selecting and purchasing any equipment and materials:

   a) objectives of the school curriculum;

b) needs of the learners which may vary, due to their ethnic or national background, or learning abilities;

c) level of competencies of the teachers to use the particular educational media, equipment and materials; and

d) adequate facilities for storage, use, maintenance and repair of the equipment and availability of adequate supply of spare parts.

Knowledge and skills required for the proper use of educational technology

1. A systematic approach shoul be adopted by all users of educational technology media, taking into consideration the educational objectives, and goals; of curriculum requirements; availability of necessary physical facilities; and conditions for use of appropriate resources; in order to solve specific educational problems or to meet the needs of the learners.

2. Teachers should be competent in designing and using various types of instructional systems which should include relevant educational technology to fulfil the requirements of the curriculum.

3. Each type of educational technology equipment should be examined in order to ascertain their cost effectiveness. In this connection, seminars may be conducted to upgrade the skills of school administrators in estimating cost effectiveness.

4. Action plans should be developed, whenever feasible, for the implementation of various types of educational technologies in the school system including educational radio and TV broadcast; computer assisted instruction; multi-media kits; the creation of mobile units to provide educational technology resources and to serve proper maintenance of equipment and facilities; and the recruitment of competent personnel or the training of personnel to maintain and carry out basic repairs on the media facilities, equipment, and materials should be planned according to the needs.

5. Educational technology specialists should be employed by educational authorities to advise, assist and work with the teachers and school administrators in procurement, design, production and use of educational technology materials.

6. Mobile units of educational technology specialists and technicians may be established in central provincial locations to provide support services to needy remote schools which are equipped with educational technology hardware.

7. Educational media centres and similar institutions should disseminate information on new development in the field of educational technology through newsletters, bulletins or pamphlets, to all the personnel and public concerned with education.

8. Specialized institutions and educational authorities who are responsible for educational technology should work in collaboration with teacher educators to form multi-disciplinary teams for providing:

a) pre-service and in-service training of teachers on the proper use of educational technology equipment;

b) advisory service to educational administrators, supervisors and curriculum developers specifically in developing awareness of proper use of educational technology;

c) technical support service to users of educational technology equipment; and

d) advisory service for the selection and procurement of educational technology materials.

Suggestions for improving the training of other educational personnel in order to promote the effective use of educational technology

1. Special orientation programmes should be devised to create awareness of the benefits that would be generated by the use of educational technology through seminars, live demonstrations, video-taped programmes, and dissemination of literature for the following clientele:

a) educational planners and policy makers;

b) educational administrators from central level to school principals;

c) teacher trainers;

d) curriculum developers; and

e) educational supervisors.

2. Pre-service teacher training on the proper use of educational technology could be enhanced in the following manner:

a) The curricula for pre-service training of teachers at various levels of education need to be reviewed in respect of the contemporaty educational technology theory and practice;

b) The syllabuses of educational technology subjects for pre-service teacher training need to be up-dated in line with newest technological developments; and

c) Special educational technology techniques and methods could be devised for pre-service training on how to use educational technology effectively. These could include:

i) modular self-paced training materials,

ii) closed-circuit television applied to teaching practice,

iii) computer programmes,

iv) video films, and

v) multi-media kits combining some or all of the above.

3. In-service training of teachers on the proper use of educational technology should be planned through a systematic approach, aiming to:

a) update the teachers' knowledge and skills in respect of newly emerging educational technology techniques and equipment;

b) improve teachers' competence in the proper use of educational technology hardware which could increase their self-confidence in handling various media;

c) train teachers to develop software for their respective subjects using all available hardware equipment; and

d) create teachers' competence for selection and procurement of new equipment as well as for proper maintenance, trouble-shooting and simple repair of faulty equipment.

4. Before implementing the pre-service and in-service training of teachers, all teacher educators who will be involved in implementing the in-service and pre-service training of teachers in educational technology should cover, through crash programmes, all aspects of the above recommendations. This is in order to build their own awareness, competence and ability to handle all kinds of educational technology media with confidence, at mastery level.

5. Educational researchers should undertake evaluative studies on the effective use of educational technology:

a) in teacher training through pre-service and in-service training programmes; and

b) on the effectiveness of the utilization of educational technology at all levels of education.

6. The studies conducted under 5(a) and 5(b) above should be distributed among all teacher educators, teacher-trainees and in-service teachers; and the results of continuous evaluation of the effectiveness of the use of educational technology in the teaching/learning process should be widely disseminated to all who are concerned with education, through periodicals or newsletters, which could devote a special column on this topic in each issue.

7. The international exchange of such information, if published in English, should be encouraged among interested countries within the framework of APEID. In cases when such information is published in the national language, financial support from UNESCO, UNICEF and other international agencies could be sought to translate essential abstracts of such publications in to English for international exchange of information.

8. Other forms of international co-operation should be promoted to enhance the effective use of educational technology through:

a) bilateral and multilateral exchange of ideas, experienced and exemplar materials (which are not subject to copyright);

b) inter-country, inter-project study visits for educational personnel at various levels, with the support of the host countries and international agencies;

c) attachments/interships among APEID participating countries through exchange of educational personnel from APEID associated centres;

d) organization of seminars, technical working group meetings and training workshops at sub-regional and regional level, aiming to promote the effective use of educational technology in the teaching/learning process. These may be supported by the governments of the participating countries and the host institution, seeking additional financial support and expertese from UN specialized agencies.

9. A roster of specialists in various fields of educational technology should be compiled by UNESCO ROEAP. This would be used to identify resource persons, to provide advisory and support services on demand to countries training programmes and to international meetings on specific aspects of use of new educational technology media.

Based on the shared country experiences and diliberations during the Regional Workshop on the use of Educational Technology by teachers held in September 1985 in KEDI, Seoul, the participating countries will disseminate the experiences revealed through this Regional activity through various actions at national level.

Each participating country submitted a proposed tentative follow-up plan for activities at national level and selected the relevant topics in their own order of priorities.

At the end, the Sub-regional Workshop was evaluated by all participants, using an Evaluation Questionnaire.

Annex 1

AGENDA OF THE WORKSHOP

1. Opening of the Workshop.
2. Election of officers of the workshop (chairman, vice-chairman, rapporteurs) and consideration of the provisional schedule of work.
3. Presentation of country papers and consideration of the knowledge, attitudes and teaching skills required by teachers in order to use educational technology successfully in school education.
4. Presentation of policies, practices and plans of the countries on teachers preparation and retraining and other steps taken by the countries in order to enable and help teachers and teacher educators to appreciate the role of educational technology and make extensive use of educational technology in promoting effective learning.
5. Presentation and appraisal of selected educational technology materials used in teacher training and in schools.
6. Presentation of some multi-media kits designed to solve specific problems in teaching practice in one-teachers school; minority and multi-cultural classes; and large classes.
7. Visits to selected projects/institutions with innovative experiences of utilization of educational technology materials by teacher educators and by classroom teachers.
8. Development of set of suggestions for improving the training of teachers and teacher educators with a view to promoting the use of educational technology by them.
9. Self evaluation of the Workshop.
10. Consideration and adoption of the report of the Workshop.
11. Closing of the Workshop.

Annex 2

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Teachers and their use of educational technology

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LIST OF SELECTED APEID PUBLICATIONS RELATING TO EDUCATIONAL TECHNOLOGY

APEID Inventory of Educational Innovations in Asia and the Pacific, EIA Nos. 131-144 (on educational broadcasting). 1981.

APEID Inventory: Low-cost educational materials: how to make, how to use, how to adapt. Vol. II. 1982.

* *Low-cost educational materials: a synthesis study. 1982.*

* *Guidelines for repackaging multi-media resources. 1982.*

* *Minicourse approach: what it is and how it works. 1982.*

* *Distance learning for teacher education (3 volumes). 1982.*

* *Report of a study group meeting on applicability of advanced technologies to educational development. 1983.*

APEID Inventory: Low-cost educational materials: how to make, how to use, how to adapt. Vol. III. 1984.

Computers in education; final report of the Third Asian Seminar on Educational Technology. 1984. (obtainable from the Japanese National Commission for Unesco, Ministry of Education, Science and Culture, 3-2-2 Kasumigaseki, Chiyoda-ku, Tokyo, Japan)

Training of personnel for distance education; report. 1984.

Distance education: exemplar training materials. 1984.

Computers in education – an outline of country experiences. 1985.

Computers in education: Inventory of training institutions, publications, societies in Asia and the Pacific (Draft). 1985.

Distance learning systems and structures – training of distance educators; report. 1985.

Preparing multi-media teaching materials; a source book. 1986.

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* Out of stock

The Asian and Pacific Programme of Educational Innovation for Development (APEID) [illegible] contribution to the building of national capabilities for [illegible] educational [illegible] and for the problems of national development, thereby improving the quality of life of the people in the Member States.

All projects and activities within the framework of APEID are planned, developed and implemented on a co-operative basis by the participating Member States, utilizing as far as possible the national centres which they have established for the purposes of APEID.

The countries which participate in APEID are: Afghanistan, Australia, Bangladesh, Bhutan, Democratic Kampuchea, Democratic People's Republic of Korea, Fiji, India, Indonesia, Iran, Japan, Lao People's Democratic Republic, Malaysia, Maldives, Nepal, New Zealand, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Samoa, Socialist Republic of Viet Nam, Sri Lanka, Thailand, Tonga, Turkey, and Union of Soviet Socialist Republics.

Each country has set up a National Development Group (NDG) to identify and support educational innovations for development within the country and facilitate exchange between countries.

The Asian Centre of Educational Innovation for Development (ACEID), an integral part of the Unesco Regional Office for Education in Asia and the Pacific in Bangkok, co-ordinates the activities under APEID and assists the Associated Centres (AC) in carrying them out.

The programme areas under which the APEID activities are organized during the third cycle (1982-1986) are:

1. Universalization of education - access to education at first level by both formal and non-formal means;
2. Education for promotion of scientific and technological competence and creativity;
3. Education and work;
4. Education and rural development;
5. Educational technology with stress on mass media and low cost instructional materials;
6. Professional support services and training of educational personnel;
7. Co-operative studies and innovative projects of research and research based experimentation related to educational development.